

Amendments to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in this application.

Listing of Claims:

1-51. (Canceled)

52. (Currently Amended) A connector for electrically connecting to pads formed on a semiconductor device, comprising:

a substrate;

an electrical circuit embedded within the substrate, a surface of the substrate exposing an exposed portion of the embedded electrical circuit;

a plurality of electrically conductive contact elements ~~formed~~ disposed on the surface of the substrate, at least one of said contact elements comprising

a base portion adhered to the substrate by a conductive adhesion layer and

a spring portion projecting away from the substrate, the conductive adhesion layer

adhered to the exposed portion of the embedded electrical circuit and extending

along the substrate underneath and apart from the spring portion; and

~~an electrical circuit embedded within the substrate, the electrical circuit being electrically connected to the at least one of the plurality of said contact elements through the conductive adhesion layer, and~~

~~a surface of the substrate exposing an exposed portion of the embedded electrical circuit, the at least one of said a contact element of the plurality of electrically contact elements formed~~

on and electrically connected to the ~~exposed portion~~ conductive adhesion layer by metal ~~plating~~ film deposition.

53. (Previously Presented) The contact elements of claim 52 separated by a pitch of less than 250 microns.

54. (Previously Presented) The contact elements of claim 52 having curvature.

55. (Previously Presented) The contact elements of claim 54 having a wiping surface that is up to approximately 50% of a second surface to which it is wiped.

56. (Previously Presented) The contact elements of claim 52 in vertical alignment with respective pads of the semiconductor device.

57. (Previously Presented) The contact elements of claim 52 coated with a conductive material.

58. (Previously Presented) The contact elements of claim 52 made from a material selected from the group of copper, copper alloy, small-grained copper-beryllium (CuBe) alloy, and a stainless steel/Cu/Ni/Au multilayer.

59. (Previously Presented) The connector of claim 52, the plurality of electrically conductive contact elements connected to solder balls formed on the semiconductor device, the solder balls having a pitch of less than 250 microns.

60. (Previously Presented) The contact elements of claim 59 having a plane of contact tangent to a side surface of the solder balls.

61. (Previously Presented) The contact elements of claim 52 having two or more curved portions.

62. (Previously Presented) The contact elements of claim 52 being of at least two types, a first type having a mechanical property different from a mechanical property of a second type.

63-67. (Canceled)

68. (Previously Presented) The contact elements and portions of the electrical circuit of claim 52 formed using a metal layer of the same type.

69-72. (Canceled)

73. (Currently Amended) The ~~at least one~~ electrical ~~device~~ circuit of claim 52 ~~comprising~~ including at least one of an interconnected metal layer, a capacitor, and an inductor.

74. (Currently Amended) A connector for electrically connecting to solder balls of a ball grid array device, comprising:

a substrate;

an electrical circuit embedded within the substrate, a surface of the substrate exposing an exposed portion of the embedded electrical circuit;

a plurality of electrically conductive contact elements ~~formed~~ disposed on the surface of the substrate, at least one of said contact elements comprising

a base portion adhered to the substrate by a conductive adhesion layer and

a spring portion projecting away from the substrate, the conductive adhesion layer adhered to the exposed portion of the embedded electrical circuit and extending along the substrate underneath and apart from the spring portion; and

~~an electrical circuit embedded within the substrate,~~ the electrical circuit being electrically connected to the at least one of the plurality of said contact elements through the conductive adhesion layer, and

~~a surface of the substrate exposing an exposed portion of the embedded electrical circuit,~~
the at least one of said a contact element of the plurality of electrically contact elements formed on and electrically connected to the exposed portion conductive adhesion layer by metal plating film deposition.

75. (Previously Presented) A plane of contact of the contact elements of claim 74 being a plane tangent to a side surface of the solder balls being contacted.

76. (Currently Amended) A The base portion and ~~an extending the spring~~ portion of the contact elements of claim 74 are a contiguous structure made from the same conductive material.

77. (Currently Amended) A The base portion and ~~an extending the spring~~ portion of the contact elements of claim 74 are formed using a first conductive metal and a second conductive metal, respectively, the first and second conductive metals being different from each other.

78. (Previously Presented) The contact elements of claim 74 are made from a material selected from the group of copper, copper alloy, small-grained copper-beryllium (CuBe) alloy, and a stainless steel/Cu/Ni/Au multilayer.

79. (Previously Presented) The electrical circuit of claim 74 formed by one or more metal layers embedded within the substrate.

80. (Previously Presented) The contact elements and at least portions of the electrical circuit of claim 74 being formed of a metal of the same type.

81. (Currently Amended) The ~~at least one~~ electrical ~~device~~ circuit of claim 74 ~~comprising~~ including at least one of an interconnected metal layer, a capacitor, and an inductor.

82. (Currently Amended) The connector of claim 52, the metal ~~plating~~ film deposition providing an integral construction between the contact element and the ~~exposed portion~~ conductive adhesion layer such that a continuous electrical path is formed between the contact element and the electrical circuit, without metal discontinuity and impedance mismatch.

83. (Currently Amended) The connector of claim 52, the at least one of said contact elements comprising a first contact element,
the surface of the substrate exposing a second exposed portion of the embedded electrical circuit,

a second contact element of the plurality of electrically conductive contact elements ~~formed on and~~ electrically connected to the ~~second exposed portion~~ a conductive adhesion layer by metal ~~plating~~ film deposition, the conductive adhesion layer adhered to the second exposed portion,

the first contact element and the second contact element disposed on the same side of the substrate, and

the first contact element, the electrical circuit, and the second contact element being contiguous such that a continuous electrical path is formed between the first contact element and the second contact element, without metal discontinuity and impedance mismatch.

84. (Previously Presented) The connector of claim 83, a third contact element of the plurality of conductive contact elements formed on the same side of the substrate as the first contact element and the second contact element, the third contact element being electrically isolated from the first contact element, the second contact element, and the electrical circuit.

85. (Previously Presented) The connector of claim 52, the electrical circuit being completely embedded within the substrate except for the exposed portion.

86. (Previously Presented) The connector of claim 52, the electrical circuit including a capacitor embedded within the substrate.

87. (Previously Presented) The connector of claim 52, the electrical circuit including an inductor embedded within the substrate.

88. (Currently Amended) The connector of claim 74, the metal ~~plating~~ film deposition providing an integral construction between the contact element and the ~~exposed portion~~ conductive adhesion layer such that a continuous electrical path is formed between the contact element and the electrical circuit, without metal discontinuity and impedance mismatch.

89. (Currently Amended) The connector of claim 74, the at least one of said contact elements comprising a first contact element,

the surface of the substrate exposing a second exposed portion of the embedded electrical circuit,

a second contact element of the plurality of electrically conductive contact elements ~~formed on and~~ electrically connected to ~~the second exposed portion~~ a conductive adhesion layer by metal ~~plating~~ film deposition, the conductive adhesion layer adhered to the second exposed portion,

the first contact element and the second contact element disposed on the same side of the substrate, and

the first contact element, the electrical circuit, and the second contact element being contiguous such that a continuous electrical path is formed between the first contact element and the second contact element, without metal discontinuity and impedance mismatch.

90. (Previously Presented) The connector of claim 89, a third contact element of the plurality of conductive contact elements formed on the same side of the substrate as the first contact element and the second contact element, the third contact element being electrically isolated from the first contact element, the second contact element, and the electrical circuit.

91. (Previously Presented) The connector of claim 74, the electrical circuit being completely embedded within the substrate except for the exposed portion.

92. (Previously Presented) The connector of claim 74, the electrical circuit including a capacitor embedded within the substrate.

93. (Previously Presented) The connector of claim 74, the electrical circuit including an inductor embedded within the substrate.

94. (New) The connector of claim 52, the conductive adhesion layer comprising one of copper-beryllium, titanium, and a polymer-based conductive adhesive.

95. (New) The connector of claim 74, the conductive adhesion layer comprising one of copper-beryllium, titanium, and a polymer-based conductive adhesive.